

UNITED STATES MARINE CORPS  
Basic Officer Course  
The Basic School  
Marine Corps Combat Development Command  
Quantico, Virginia 22134-5019

B1401

## INTRODUCTION TO LAND NAVIGATION/THE MAP

### Student Handout

#### 1. **Introduction to the Land Navigation Package**

##### a. Lesson schedule

	<u>TITLE</u>	<u>HOURS</u>	<u>DATE</u>
B1401	Introduction to Land Navigation/The Map	1.5	
B1405	Direction	1.5	
B1410	Terrain Analysis	1.5	
B1411	Terrain Walk	3.0	
B1415	Land Navigation: Tools and Techniques	4.0	
B1425	Land Navigation I	3.0	
B1435	Night Navigation I	3.0	
B1445	Land Navigation II	5.0	
B1450	Water, Vegetation and Manmade Features	1.0	
B1455	Location	1.0	
B1456	The 1:50,000 Scale Map	5.0	
B1460X	Night Navigation Final	5.0	
B1470X	Land Navigation Written Examination	3.0	
B1480	Land Navigation III	7.0	
B1485X	Land Navigation Final Exercise	<u>8.0</u>	
		Total Hours	52.50

##### b. Requirements

(1) Materials. After your first class, B1401, Introduction to Land Navigation/The Map, you must obtain the following items. (Items (a) - (e) are available at the Camp Barrett Exchange.) Wait until after B1401 to purchase these items.

- (a) Ruler with a millimeter scale.
- (b) Lead pencils: #4 and #2
- (c) Pencil sharpener

- (d) Eraser
- (e) Whistle
- (f) Protractor. Will be issued in class.

(2) Maps. You will be issued the following maps during your first class:

- (a) Quantico 1:25,000 Special
- (b) Quantico 1:50,000 Special
- (c) Quantico V734 5561 III
- (d) New River V742 5553 III
- (e) Margarita Peak V795 2550 IV
- (f) Inchon L754 3120 IV

(3) Map lamination. After B1401, you must laminate your 1:50,000 Quantico special map sheet. You can either laminate it yourself using lamination paper purchased from the Camp Barrett MCX or have it done commercially. There are a number of teacher supply/office supply stores in the area that will do a fairly good job for a relatively small fee. If you do utilize a commercial vendor, be extremely careful not to get folds in your map prior to or during the lamination process. Replacement maps are extremely hard to come by.

c. Administrative details

(1) Study-assignments. Become familiar with reading assignments prior to each class to obtain necessary background for scheduled instruction.

(2) Acceptable work tolerance. Due to differences in protractors, grid readers, and millimeter scales, tolerances of  $\pm 50$  meters will be allowed. Always use a sharp #4 pencil for map work.

(3) Materials. Check advance sheets and bring appropriate materials to all classes and field work sessions. Only the materials listed in the "Here Is What To Do" portion of the advance sheet are required. You may not use calculators or slide rules in any phase of land navigation instruction.

(4) Instructor assistance. Do not hesitate to seek assistance at any time. The land navigation office is located in the Instructional Group, Heywood Hall, phone extension 5556/5379.

2. **Definition of a Military Map**

3. **Purposes of Marginal Information**

- a. Identification
- b. Interpretation
- c. Evaluation

4. **Marginal Information**

- a. Series name and scale
- b. Sheet name
- c. Edition note
- d. Series and sheet number
- e. Map date
- f. Index to adjoining sheets and boundaries

B1401 INTRO TO LAND NAVIGATION/THE MAP

- g. Declination diagram
- h. Scale
- i. Graphic scale (or bar scale)
- j. Contour interval
- k. Horizontal datum
- l. Vertical datum
- m. Grid reference box
- n. Legend
- o. Stock number
- p. Elevation guide

5. **Topographic Symbols**

- a. Definition
- b. Colors used
  - (1) Black - works of man
  - (2) Brown - terrain features \*
  - (3) Green - vegetation
  - (4) Blue - water
  - (5) Red - road conditions and built-up areas \*

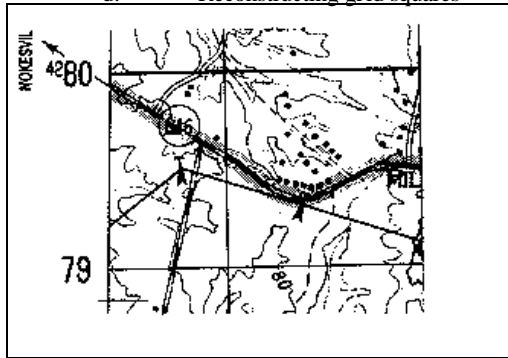
\* Recent maps show only four colors. Brown and red colors have been combined to make military maps red-light readable. Likewise, the features these colors represent are also combined, i.e. RED/BROWN - terrain features, roads, and built-up areas.

6. **Military Grid Reference System (MGRS)**

- a. 1000 meter grid square (1000m X 1000m)
  - (1) Small squares on map sheet
  - (2) Designated by four digit number - Read "Right", Then "Up".

7. **Protractor**

- a. Location to nearest 100 meters (6-digit number)
- b. Location to nearest 10 meters (8-digit number)
- c. Tolerance ( $\pm 50$  meters)
  - (1) Example 1: 88269182  
$$\begin{array}{r} +5 \quad +5 \\ 88319187 \end{array}$$
  - (2) Example 2: 88269182  
$$\begin{array}{r} -5 \quad -5 \\ 88219177 \end{array}$$

d. Reconstructing grid squares8. **Utilizing Graphic Scale for Measuring Horizontal Distance**

a. Graphic scale. A graphic scale is a pre-measured map distance corresponding to a certain ground distance. The map distance is marked off as a straight line in the margin of the map sheet, then subdivided and labeled in terms of the corresponding ground distance. This scale enables the map user to measure distances by visual examination, avoiding lengthy and repetitive calculations. Military maps contain several graphic scales. This feature allows quick measurements of ground distance in different units (i.e., meters/kilometers, statute miles, yards, and nautical miles). It also enables the map user to make conversions from one unit of measure to another quickly and easily.

b. Parts of the graphic scale

- (1) Primary scale
- (2) Extension scale

c. Methodology

- (1) Straight-line distance
- (2) Curved-line distance

9. **Map Categories by Scale**a. Large scale--1:75,000 and larger

- (1) Covers relatively small area
- (2) Contains good detail
- (3) Used for tactical purposes

b. Medium scale--smaller than 1:75,000 and larger than 1:600,000

- (1) Covers a larger area
- (2) Contains less detail
- (3) Used for strategic purposes and air navigation

c. Small scale--1:600,000 and smaller

- (1) Covers an extremely large area
- (2) Contains almost no detail

d. Small unit leaders utilize large scale maps

APPENDIX A  
REQUIREMENT 1

Map: Virginia, 1:50,000, Sheet 5561 III, Series V734, Edition 6-DMATC

1. What are the map sheet number and series number on which you would find grid square (GS) 0567?

ANS.  
ANS.

2. What are the coordinates of the following objectives to the nearest hundred meters?

- |    |                                    |      |
|----|------------------------------------|------|
| a. | spot elevation 94 in GS 9172       | ANS. |
| b. | Little Union Ch in GS 9572         | ANS. |
| c. | building in GS 8468                | ANS. |
| d. | major road intersection in GS 9378 | ANS. |

3. What are the map sheet number and series number on which you find grid square 8960?

ANS.  
ANS.

4. What is located at each of the following coordinates?

- |    |          |      |
|----|----------|------|
| a. | 03437463 | ANS. |
| b. | 99528472 | ANS. |
| c. | 86857645 | ANS. |

5. What are the coordinates of the following objectives to the nearest ten meters?

- |    |   |      |
|----|---|------|
| a. | water tower in GS 9474  | ANS. |
| b. | water tower in GS 9570  | ANS. |
| c. | intersection of stream and unimproved surface road in NE corner road of GS 9079 | ANS. |
| d. | bridge in GS 9290   | ANS. |
| e. | church in GS 9980   | ANS. |

6. What are the map sheet number and series number on which you would find grid square 7962?

ANS.  
ANS.

7. What is located at each of the following coordinates?

- |    |          |      |
|----|----------|------|
| a. | 92508018 | ANS. |
| b. | 95287876 | ANS. |
| c. | 94538050 | ANS. |
| d. | 90627982 | ANS. |

B1401

- e. 95507180 ANS.
8. What are the 8-digit grid coordinates of the following objectives?
- a. post chapel in GS 9864 ANS.
- b. school in GS 9983 ANS.
- c. clay pit in GS 0483 ANS.
- d. cemetery in GS 8778 (NW of road intersection) ANS.
- e. tower in GS 8365 ANS.

REQUIREMENT 1 SOLUTION

1. Sheet 5561 II,  
Series V733
2. 6-digit grid coordinates; no tolerance.
- a. 916728
- b. 955726
- c. 846688
- d. 933783
3. Sheet 5560 IV  
Series V734
4. a. railroad bridge  
b. road junction  
c. stream junction
5. Questions requiring accuracy to the nearest 10 meters require an 8-digit grid coordinate as an answer. Your 8-digit grid coordinate should be within 50 meters of the solution.
- a. 94977455
- b. 95837014
- c. 90927990
- d. 92489058
- e. 99198089
6. Sheet 5460 I  
Series V734
7. a. cemetery  
b. church  
c. school  
d. road junction  
e. ford
8. Answers should be within  $\pm 50\text{m}$  of the solution.
- a. 98306494
- b. 99718372
- c. 04218368
- d. 87787868
- e. 83616515

NOTE: To determine if your answer falls within the  $\pm 50$  meter acceptable tolerance, add or subtract 5 from the fourth and eighth digits. For example, an acceptable tolerance for the 8-digit coordinate 85588135 would be any answer between 85538130 and 85638140:

Example: 85588135    85588135  
-5 -5    +5 +5

B1401

85538130

85638140

APPENDIX B

REQUIREMENT 2

Map: Virginia, 1:50,000, Sheet 5561 III, Series V734, Edition 6-DMA

1. What are the map sheet number and series number on which you would find grid square (GS) 8175?

ANS.

ANS.

2. What is located near each of the following coordinates?

a. 963676 ANS.

b. 035701 ANS.

c. 879728 ANS.

3. What are the coordinates of the following objectives to the nearest 100 meters?

a. the church in GS 9578? ANS.

b. substation in GS 0180 ANS.

c. water tank in GS 0280? ANS.

d. road intersection in GS 8966? ANS.

e. stream junction in GS 8670? ANS.

4. What are the map sheet number and series number on which you would find grid square 0693?

ANS.

ANS.

5. What is located at each of the following coordinates?

a. 86277499 ANS.

b. 92866668 ANS.

c. 95507180 ANS.

6. What are the coordinates of the following objectives to the nearest ten meters?

a. power substation in GS 8578? ANS.

b. the school in GS 0075? ANS.

c. school in GS 9480 ANS.

d. library in GS 0178 ANS.

e. stream junction in GS 9381 ANS.

7. In what state and county are grid coordinates 02536411 located?

ANS.

8. What is located at each of the following coordinates?

B1401

- |    |          |      |
|----|----------|------|
| a. | 94486845 | ANS. |
| b. | 87996438 | ANS. |
| c. | 04158970 | ANS. |
| d. | 91248483 | ANS. |
| e. | 91308300 | ANS. |

---

REQUIREMENT 2 SOLUTION

1. Sheet 5461 II  
Series V734
2.
  - a. Russell School
  - b. Cockpit Point light
  - c. lookout tower
3.
  - a. 953788
  - b. 014807
  - c. 021808
  - d. 895668
  - e. 869709
4. Sheet 5561 I  
Series V734
5.
  - a. combat village
  - b. stream junction
  - c. ford
6.
  - a. 85787863
  - b. 00097560
  - c. 94548050
  - d. 01437824
  - e. 93408113
7. Maryland, Charles County
8.
  - a. power-transmission line junction
  - b. gravel pit
  - c. gaging station
  - d. unimproved surface road on a hill
  - e. church

APPENDIX CREQUIREMENT 3

Map: Virginia, 1:50,000, Sheet 5561 III, Series V734, Edition 6-DMA

1. What are the map sheet number and series number on which you would find the coordinate 04006300?

ANS.

ANS.

2. What are the coordinates of the following objectives to the nearest hundred meters?

a. cemetery in GS 8778 SE of road intersection      ANS.

b. water tower in GS 9570      ANS.

c. junction of perennial and intermittent stream in GS 9267      ANS.

d. gravel pit in GS 9572      ANS.

3. What are the map sheet number and series number on which you would find grid square 8293?

ANS.

ANS.

4. What are the coordinates of the following objectives to the nearest ten meters?

a. hard surface road and unimproved road junction nearest BM 87.7 in GS 9376?      ANS.

b. BM 73.0 in GS 9570      ANS.

c. fire station in GS 9681      ANS.

d. powerline junction 0088      ANS.

e. gaging station in GS 0489      ANS.

5. What is located at the following grid coordinates?

a. 90047489      ANS.

b. 95507263      ANS.

c. 86526622      ANS.

6. What are the map sheet number and series number on which you would find the coordinate 04007500?

ANS.

ANS.

7. What is located at the following coordinates?

a. 99738370      ANS.

b. 97036696      ANS.

c. 99507043      ANS.

d. 93326720      ANS.

B1401

- [illegible]

### REQUIREMENT 3 SOLUTION

1. Sheet 5560 I  
Series V733
2. Questions requiring accuracy to the nearest 100 meters require a 6-digit grid coordinate as an answer.
  - a. 879786
  - b. 958702
  - c. 924678
  - d. 954720
3. Sheet 5461 I  
Series V734
4. This requires an 8-digit grid coordinate. Each answer must be within 50 meters of the solution.
  - a. 93827614
  - b. 95407043
  - c. 96248105
  - d. 00868847
  - e. 04158972
5.
  - a. cemetery
  - b. Little Union Church
  - c. trail intersection

B1401

6. Sheet 5561 III  
Series V734
7.
  - a. Woodbridge High School
  - b. radio tower
  - c. stream junction
  - d. hilltop
  - e. masonry dam
8.
  - a. 97557194
  - b. 95507178
  - c. 86287496
  - d. 95287877
  - e. 99877690
9.  $2000 \pm 50\text{m}$
10.  $1075 \pm 50\text{m}$
11.  $4575 \pm 50\text{m}$
12.  $4340 \pm 50\text{m}$
13.  $1780 \pm 50\text{m}$

